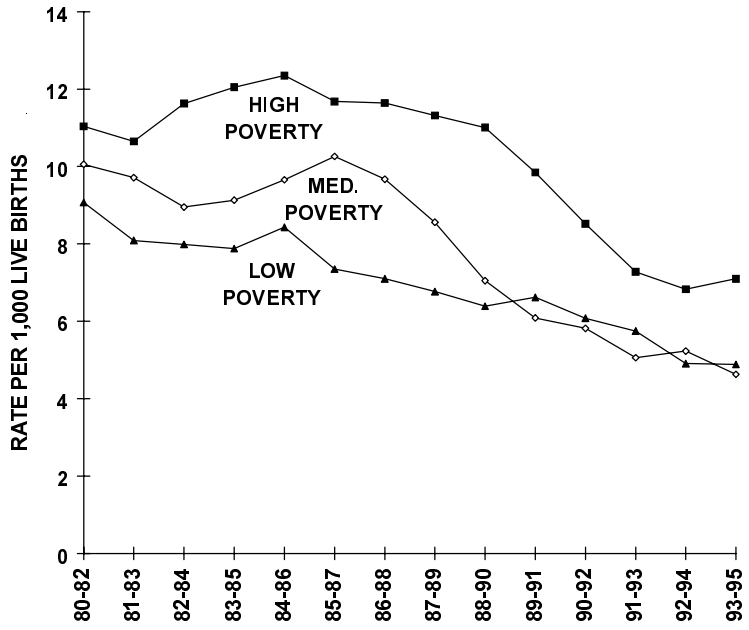
CHAPTER IV: TRENDS IN INFANT MORTALITY BY POVERTY AREAS

Universally, infants of low socioeconomic status have higher mortality rates.[1-5] Few measures of socioeconomic status, though, are currently available from birth certificates. The number of years of education completed by the infant's mother and source of payment for labor and delivery services are available. However, both of these variables were added only recently to vital records (in 1992), and therefore cannot be used to examine trends.

Another measure of socioeconomic status is low income. While no easily accessible data[a] exist indicating how many King County infants are born into poverty, we can compare infant mortality rates between those living in the poor areas and the more affluent areas within the county. The U.S. Census provides data for each census tract on the proportion of female residents age 12 to 64 who live in households with incomes below the poverty line.[b] A census tract is a geographic area which contains approximately 4,000 residents; there were 285 census tracts in King County in 1980. We created three equal size groups of census tracts based on the proportion of females age 12 to 64 years old living in households with income below poverty, and called these the high, medium, and low poverty areas. The high poverty group of tracts therefore contains the third of census tracts with the highest proportion of low-income households.

In this chapter we evaluate trends of infant mortality, causes of death, and birth risk factors among different poverty level groups.

FIGURE 4.1: INFANT MORTALITY IN KING COUNTY BY CENSUS TRACT POVERTY LEVELS THREE YEAR ROLLING AVERAGES, 1980-1995



NOTE: ALL TRENDS FROM 1980-1995 AND FROM 1985-1995 SHOW A STATISTICALLY SIGNIFICANT DECREASE.
SOURCE: BIRTH AND DEATH CERTIFICATES.

1. TRENDS IN INFANT MORTALITY IN HIGH AND LOW POVERTY AREAS

While the infant mortality rate has declined consistently in recent years in the low and medium poverty areas, it appears that the period of marked decline in the high poverty areas ended in 1993. During the 1993-1995 period, the rate in the high poverty areas was 1.5 times higher than that of the low poverty areas (Figure 4.1). This difference is statistically significant.

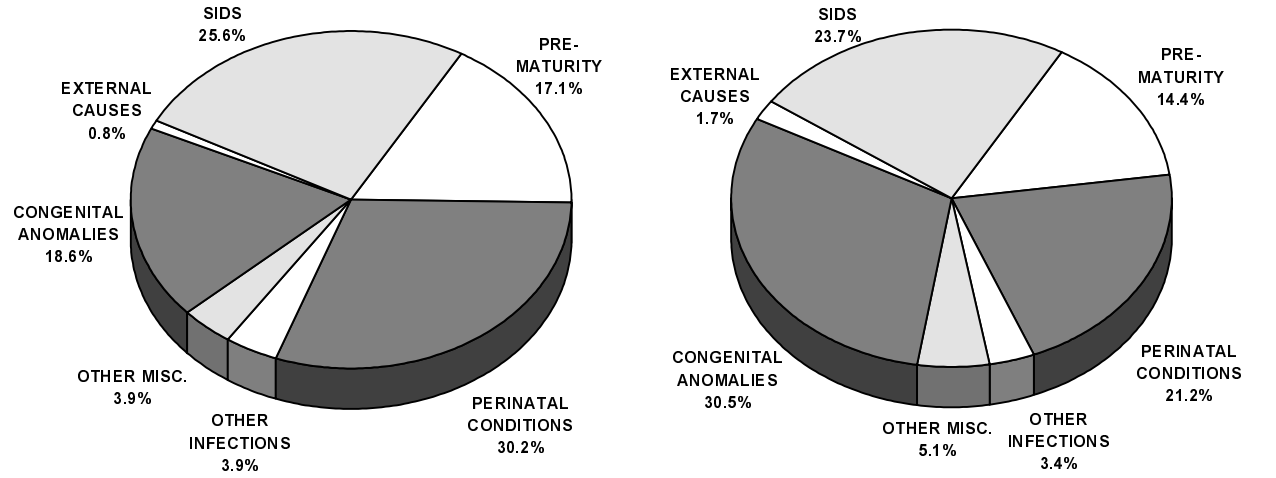
[a] Birth certificates do not assess maternal income. Information on source of payment for prenatal care has been collected since 1992. Source of payment can serve as a proxy for income because mothers whose source is classified as Medicaid or charity care are likely to have low incomes. The birth certificate also contains information on the educational attainment of the mother, which is an important measure of socioeconomic status. However, information on education is missing on 15.5 percent of birth certificates.

[b] $12,674 per year for a four-person household in 1989, the year for which the U.S. Census collected information.

2. Trends In Specific Causes Of Infant Mortality In High And Low Poverty Areas

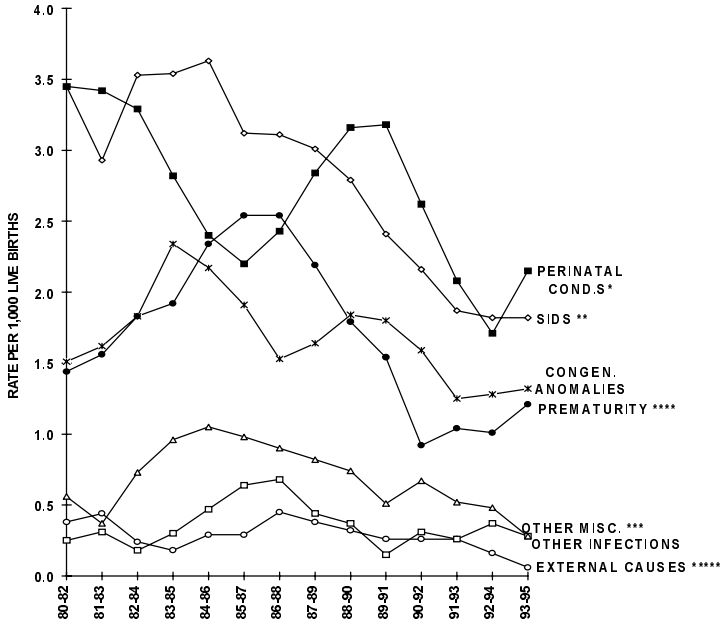
The infant mortality rates for most causes of death in the high poverty areas exceeded that of the low poverty areas in King County. In the low poverty areas, the leading cause of infant death in the 1993-1995 period was congenital anomalies, followed by SIDS, deaths due to perinatal conditions, and deaths due to prematurity (Figure 4.2). In contrast, the leading cause of infant death in the same period among the high poverty areas was deaths due to perinatal conditions, followed by SIDS, congenital anomalies, and deaths due to prematurity.

FIGURE 4.2: MAJOR CAUSES OF INFANT MORTALITY
HIGH POVERTY AREAS COMPARED TO LOW POVERTY AREAS
KING COUNTY, 1993-1995



SOURCE: BIRTH AND DEATH CERTIFICATES.

FIGURE 4.3: CAUSES OF INFANT MORTALITY
HIGH POVERTY AREAS IN KING COUNTY
THREE YEAR ROLLING AVERAGES, 1980-1995

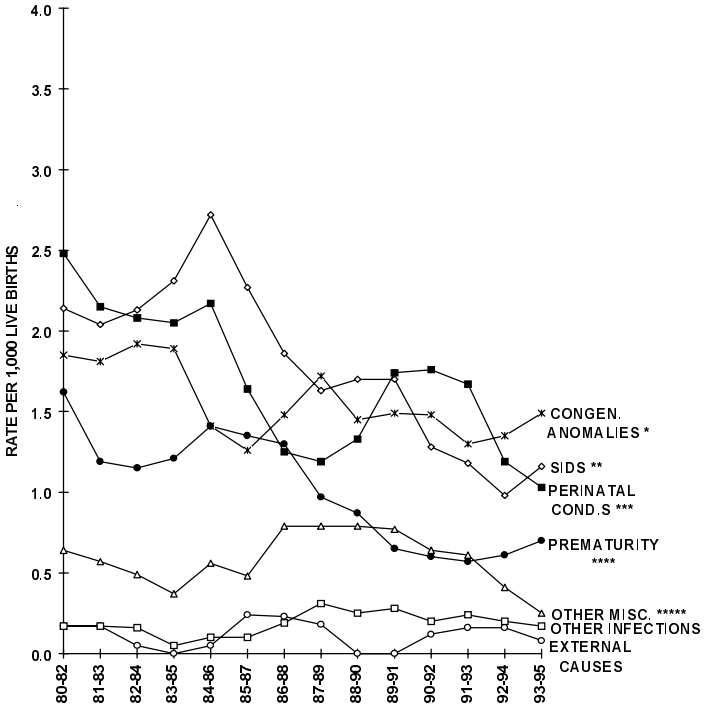


* THIS TREND FROM 1980-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
** THIS TREND FROM 1984-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
*** THIS TREND FROM 1985-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
**** THIS TREND FROM 1980-1986 IS A STATISTICALLY SIGNIFICANT INCREASE, AND FROM 1986-1992 IS A STATISTICALLY SIGNIFICANT DECREASE.
***** THIS TREND FROM 1986-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.

SOURCE: BIRTH AND DEATH CERTIFICATES.

The overall trends in the four major causes of death (congenital anomalies, SIDS, perinatal conditions, and prematurity) differed between the high and low poverty areas (Figures 4.3 and 4.4). The death rate due to congenital anomalies in the high poverty areas has fluctuated and decreased slightly since the 1980-1982 period, and has leveled off since the 1991-1993 period. The SIDS rate in the high poverty areas declined significantly since the mid-1980s, although in recent years the rate of change seems to have leveled. The decline observed in death rates due to prematurity and perinatal conditions in the late 1980s and early 1990s seems to have ended recently in the high poverty areas. The slowing decline in infant mortality rate in the high poverty areas appears to be due mainly to increased rates of death from prematurity and perinatal conditions.

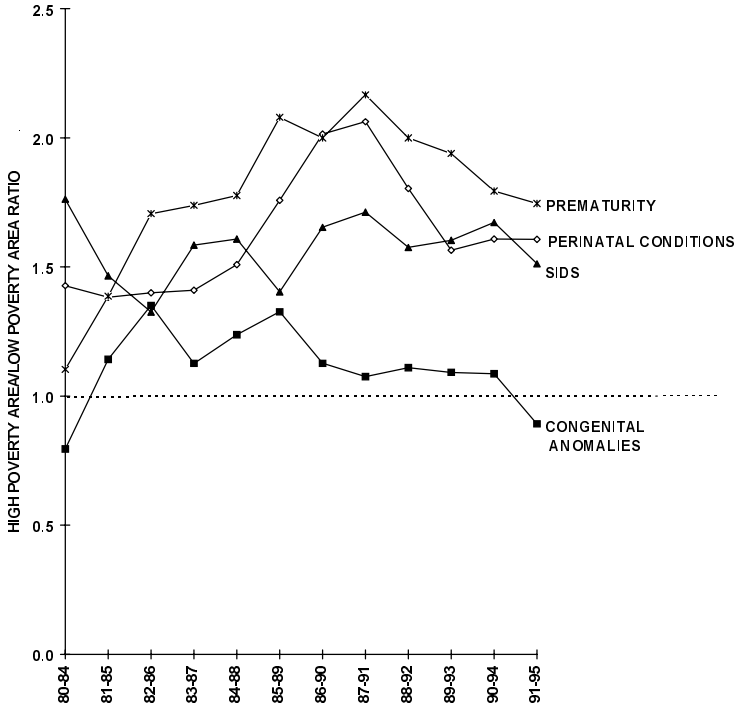
FIGURE 4.4: CAUSES OF INFANT MORTALITY
LOW POVERTY AREAS IN KING COUNTY
THREE YEAR ROLLING AVERAGES, 1980-1995



* THIS TREND FROM 1993-1995 IS A STATISTICALLY SIGNIFICANT INCREASE.
** THIS TREND FROM 1985-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
*** THIS TREND FROM 1991-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
**** THIS TREND FROM 1986-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
***** THIS TREND FROM 1988-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
SOURCE: BIRTH AND DEATH CERTIFICATES.

The death rate due to congenital anomalies in the low poverty areas decreased in the mid-1980s and then has fluctuated around a new lower plateau since. The SIDS rate in the low poverty areas showed a similar trend as in the high poverty areas, except that it indicates an increase in the 1993-1995 period as compared to 1992-1994 period. Deaths due to perinatal conditions continued to decline in the low poverty areas.

FIGURE 4.5: CAUSES OF INFANT MORTALITY
RATIO OF HIGH TO LOW POVERTY AREAS IN KING CO.
FIVE YEAR ROLLING AVERAGES, 1980-1995



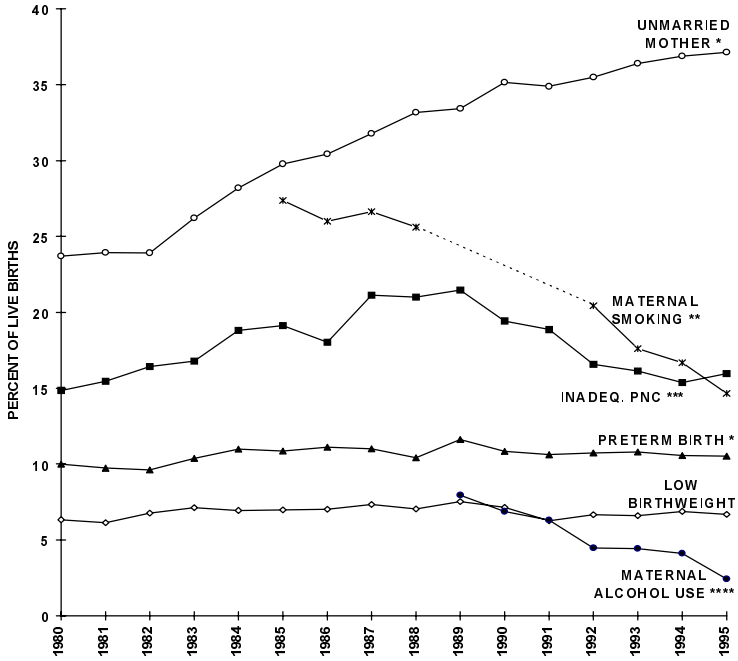
SOURCE: BIRTH AND DEATH CERTIFICATES.

The relative rates for each cause of death between the high and low poverty areas have not changed significantly in recent years (Figure 4.5).

The persistence of the differences between the high and the low poverty areas for the major causes of infant death (such as deaths due to prematurity, deaths due to perinatal conditions, and SIDS) should prompt attention to programs providing health and social services to low income pregnant women, in addition to assessing educational programs which address sleep safety issues.

3. CHANGING RISK FACTORS FOR INFANT MORTALITY IN HIGH AND LOW POVERTY AREAS

FIGURE 4.6: BIRTH RISK FACTORS FOR HIGH POVERTY AREAS IN KING COUNTY 1980-1995



* THIS TREND FROM 1980-1995 IS A STATISTICALLY SIGNIFICANT INCREASE.
** THIS TREND FROM 1985-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
*** THIS TREND FROM 1980-1987 IS A STATISTICALLY SIGNIFICANT INCREASE AND FROM 1987-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
**** THIS TREND FROM 1989-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
SOURCE: BIRTH AND DEATH CERTIFICATES.

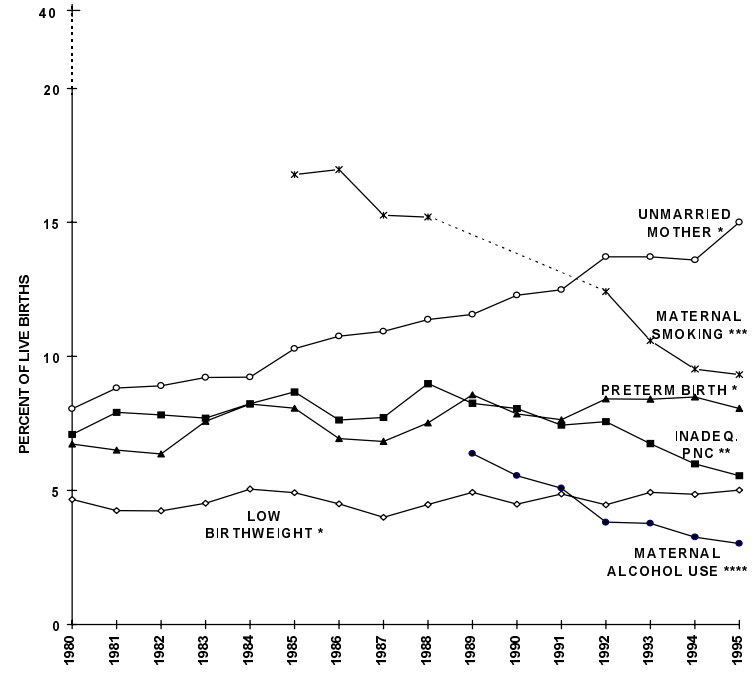
In the high poverty areas, recent trends in birth risk factors have continued in the 1993-1995 period, except for a slowing of improvement in prenatal care access (Figure 4.6).

One potential explanation of the lack of improvement in access to prenatal care in the high poverty areas may be related to changes in Medicaid policies.

Medicaid provides government-sponsored health coverage for low income persons. Initially, coverage was available only to women and children who had incomes below 90% of the federal poverty level and were on Aid For Dependent Children (AFDC), but in recent years the program was expanded to include women and children with incomes up to 185% of the federal poverty level ("expanded eligibility group"). From the time Medicaid-managed care was implemented in October 1993 until February 1995, only families on AFDC were required to enroll in a managed care plan. This meant that families chose their health plan when they were enrolled in AFDC, so many had on-going health care before becoming pregnant. Pregnant women in the "expanded eligibility group" were still covered by Medicaid in the fee-for service system, but received health care coverage only after becoming pregnant.

In February 1995, the "expanded eligibility group" was also required to enroll in a managed care plan. This made the process of accessing prenatal care more complex for that group of women. Once a woman became pregnant she had to get a pregnancy verification and apply for Medicaid. When found eligible, she had to choose a managed care plan, choose a primary care provider in that plan, and then either begin prenatal care with that primary care provider or be referred by the provider to prenatal care. Both a delay in the initiation of care as well as fewer visits to a prenatal care provider may have resulted from this process, as reflected in the 1995 data. The data indicate a need for continued evaluation of the appropriateness of a managed care financing mechanism for a population that does not have continuous eligibility.

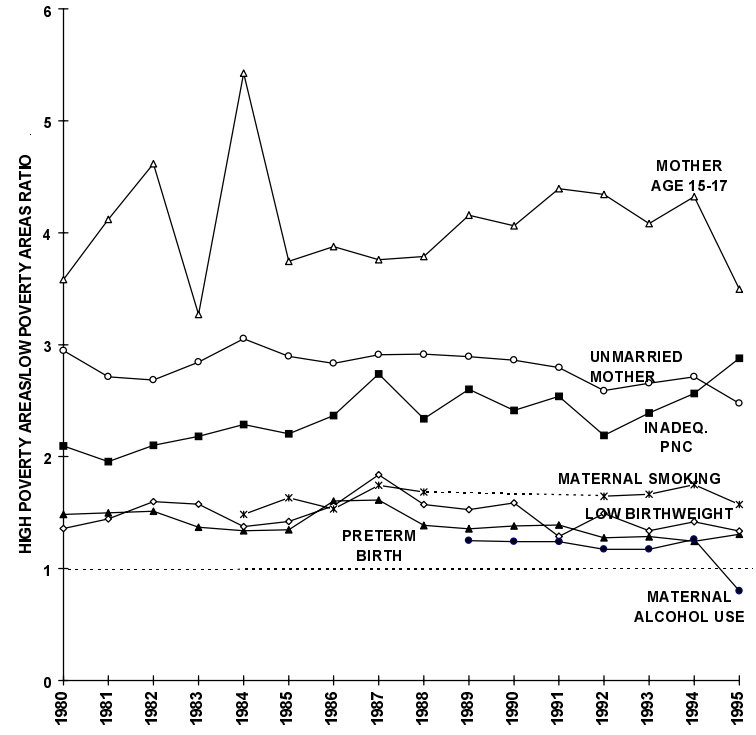
FIGURE 4.7: BIRTH RISK FACTORS FOR LOW POVERTY AREAS IN KING COUNTY 1980-1995



* THIS TREND FROM 1980-1995 IS A STATISTICALLY SIGNIFICANT INCREASE.
** THIS TREND FROM 1980-1988 IS A STATISTICALLY SIGNIFICANT INCREASE AND FROM 1988-1995 A STATISTICALLY SIGNIFICANT DECREASE.
*** THIS TREND FROM 1985-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
**** THIS TREND FROM 1989-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
SOURCE: BIRTH AND DEATH CERTIFICATES.

Access to prenatal care has continued to improve steadily in the low poverty areas (Figure 4.7). Since the early 1990s, the rate for unmarried mothers continued to increase while the rates for maternal smoking and alcohol use continued to decline. No significant changes occurred for preterm birth and low birthweight rates.

FIGURE 4.8: BIRTH RISK FACTORS RATIO OF HIGH TO LOW POVERTY AREAS IN KING CO. 1980-1995



SOURCE: BIRTH AND DEATH CERTIFICATES.

The continued improvement of access to prenatal care in low poverty areas has resulted in an increasing difference in access to prenatal care between low and high poverty areas (Figure 4.8).

Women living in high poverty areas are 2.6 times more likely to receive inadequate prenatal care than those living in low poverty areas. The differences in other birth risk factors have slowly decreased in recent years, but residents of high poverty areas still have higher rates of all risk factors.

All of the measured risk factors discussed above explain only a portion of the increased infant mortality in high poverty areas. Many other unmeasured risk factors also occur (see discussion of unmeasured risk factors on pages 7-9).

SUMMARY

- The period of marked decline in infant mortality in the high poverty areas appears to have ended in 1993.

- The leading cause of death for infants living in the high poverty areas during the 1993-1995 period was death from perinatal conditions. Among infants living in the low poverty areas, death from congenital anomalies was the leading cause of death. For causes of infant death during 1993-1995, the largest ratio between the high and low poverty areas was found in prematurity and perinatal conditions.

- Recent trends in birth risk factors have continued into the 1993-1995 period in the high poverty areas except for a slowing of improvement in access to prenatal care. Women living in the high poverty areas are 2.6 times more likely to receive inadequate prenatal care than those living in the low poverty areas. The differences in other birth risk factors have slowly decreased in recent years, but residents of the high poverty areas still have higher rates of all risk factors.

- Despite the overall decline in the infant mortality rate and the improving trends for most risk factors in the high poverty areas, the differences between the high and low poverty areas for the major causes of infant death and birth risk factors still persist. This should prompt attention to programs providing health and social services to low income pregnant women, in addition to assessing educational programs which address sleep safety issues.

REFERENCES

[1] Wise PH, Kotelchuck M, Wilson ML et al. Racial and socioeconomic disparities in childhood mortality in Boston. New England Journal of Medicine 1985; 313(6):360-66.
[2] Spurlock CW, Hinds W, Skaggs JW et al. Infant death rates among the poor and nonpoor in Kentucky. Pediatrics 1987; 80(2):262-69.
[3] Little R, Peterson D. Sudden Infant Death Epidemiology: A Review and Update. Epidemiological Reviews 1990; 12:241-246.
[4] Gould JB, LeRoy S. Socioeconomic status and low birthweight: a racial comparison. Pediatrics 1988; 82(6):896-904.
[5] Starfield B. Postneonatal mortality. Ann Rev Public Health 1985; 6:21-40.